

For ascertaining the amount of carbonic acid in the air the following apparatus is supplied Two glass jars, cubic capacity marked in cubic centimeters.

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity.

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used

Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommended. Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

by calculating according to the atomic weights. it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair

that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime into volume according to the atomic weights, and in one sum by the factor .39748+. which has combined with the carbonic acid. The amount of the latter is obtained by converting weight by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. The Thirty cubic centimeters of lime are poured into the graduated glass and its alkalinity determined

of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes. the lime water before and after it has been placed in the jar by 795 and divide this sum by the number The following rule will simplify the calculation: Multiply the difference between the alkalinity of

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62°. may be stated with sufficient accuracy thus: For every 5° Fahrenheit above 62° add 1 per cent, to the As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit.

The formula for the correction for pressure is as follows:

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-30 : observed height of bar. : : capacity : z. G 700 AA 1879



Atmospheric observations on board U.S. Artic Steamer Jeanette 1879-81.

Dr. James M.M. Ambler, U.S.N.

Atmospheric Observations on board U.S.S Aralis (

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Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the morning. The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in column instruments to be used in all hygrometric observations.

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in the morning should be selected. The results will not be entered unless the observer is certain of their accuracy.



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For ascertaining the amount of carbonic acid in the air the following apparatus is supplied: Two glass jars, cubic capacity marked in cubic centimeters.

India-rubber stoppers, and sheet india rubber to tie over neeks of jars.

Thus measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths

Glass bottle of one liter capacity.

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litmus or turmeric paper.

 $\Lambda$  small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommended: Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair

by calculating according to the atomic weights.

eight hours and not more than twenty-lour; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

into volume according to the atomic weights, and in one sum by the factor .39748+. difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime which has combined with the carbonic acid. The amount of the latter is obtained by converting weight by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. Thirty cubic centimeters of lime are poured into the graduated glass and its alkalinity determined

the lime water before and after it has been placed in the jar by 795 and divide this sum by the number The following rule will simplify the calculation: Multiply the difference between the alkalinity of

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62°. may be stated with sufficient accuracy thus: For every 5° Fahrenheit above 62° add 1 per cent, to the of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes. As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit

The formula for the correction for pressure is as follows:

30: observed height of bar. :: capacity: z.

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-

## Atmospheric Observations on board U.S.S

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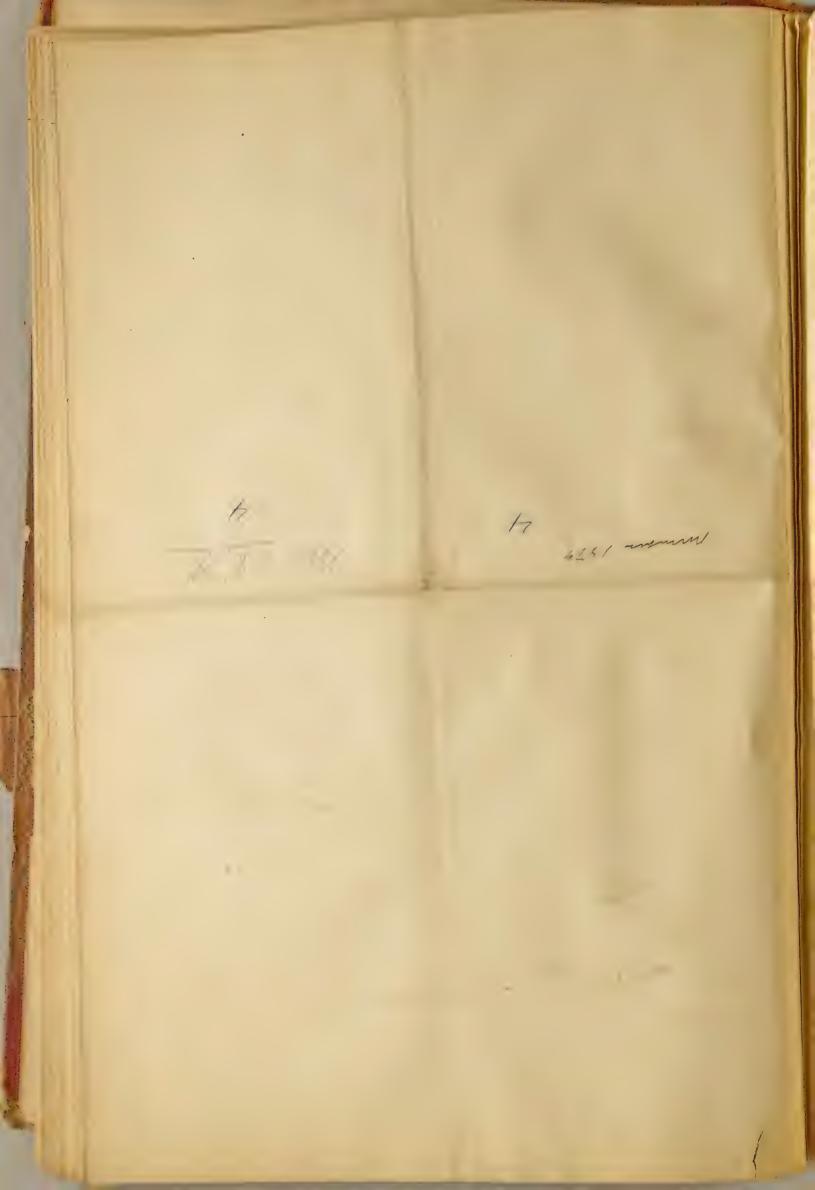
Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early the time and circumstances of observations for carbonic acid and the wetting of the decks from any cases will be a same instruments to be used in all hygrometric observations.

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Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over neeks of jars.

Glass measure graduated to 60 c. c.

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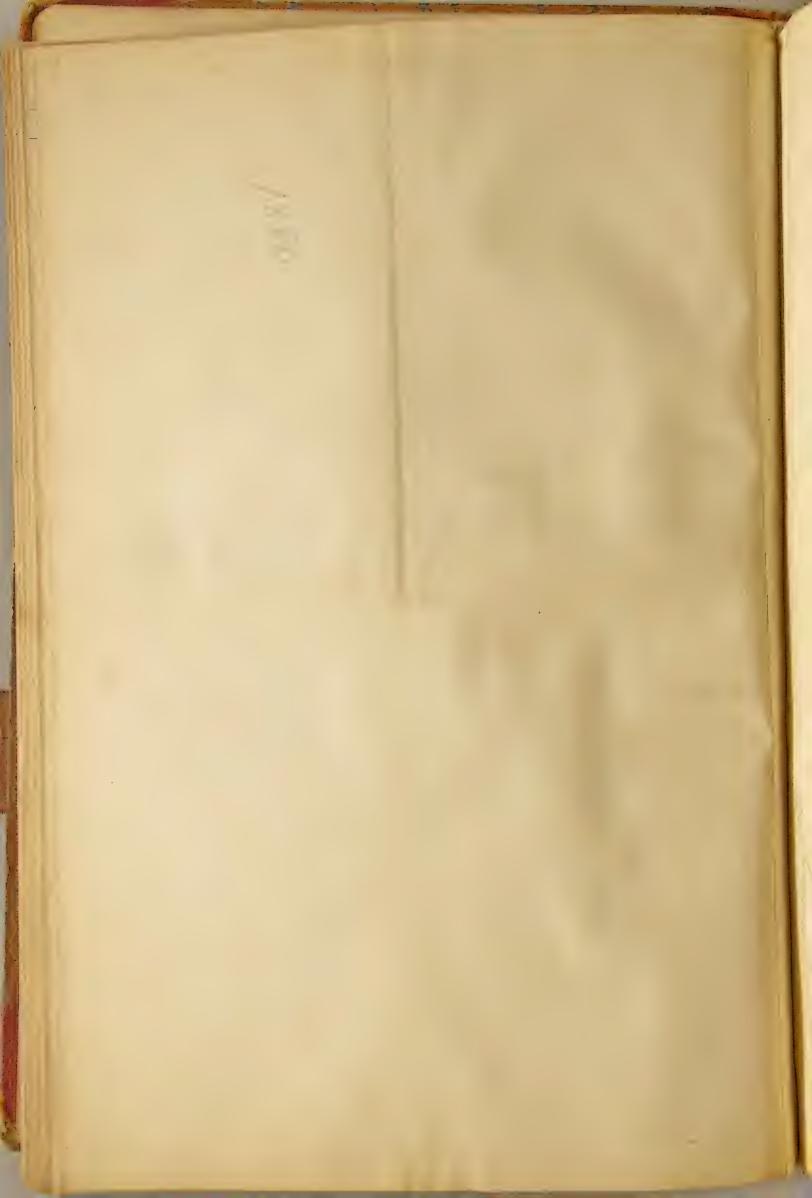
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Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in to the time and circumstances of observations for carbonic acid and the wetting of the decks from any cruss will be come instruments to be used in all hygranetric observations.

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India-rubber stoppers, and sheet india rubber to tie over necks of jars.

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Bottle containing litmus or turmeric paper.

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			SPAR DECK.				10 P. M		10 a s	1.	1	
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	V	-39.4	30.88	-38.3		31.06	-39.4		14. 12	78	13 14	y 13
	3 31.05°	-37.0	30.85	.32,7		30.72	-31.1		11.5 10	81.5	11 1	17 115
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	: 30.44	-32,2	34.57	25.0		30.72	-34.4		15,5 14,5			
	6 30.74	-33,3	3072	-33.0		20.80	30.0		17 14	90	14,5 1.	83 15
	- 30 96	-28,0	30,57	-24.1.		30,62	-24.7		14 15	88	15 /3	13,5 15
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	13 30.50	-32,5	30.38	-36.1		30.32	-37.2	١	16 15	. 84	17 1	180 1.
	14 30.14	-37.2	30,04	-35,8		29.96	-33.8		18 16,	585	77 /	:3 17
	15 3072	-322	29.44	-31,3		2991	-34.1		15,5 13,	583.	5 15.5 1	17 16
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	23 30 42	-34.4	30.46	_35,2		30,45	-34,2		13.8 /			118 1
	21 30.42	-31,4	30,42	_33.60	•	30.47			14.51			180 1
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	21; 3036	- 35.0	30.24	-35:1		30.20			141			110
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	30 3006	-40,5	29.99			300:			15.5		15:	1/12
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Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the last The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in Same instruments to be used in all hygrometric observations.

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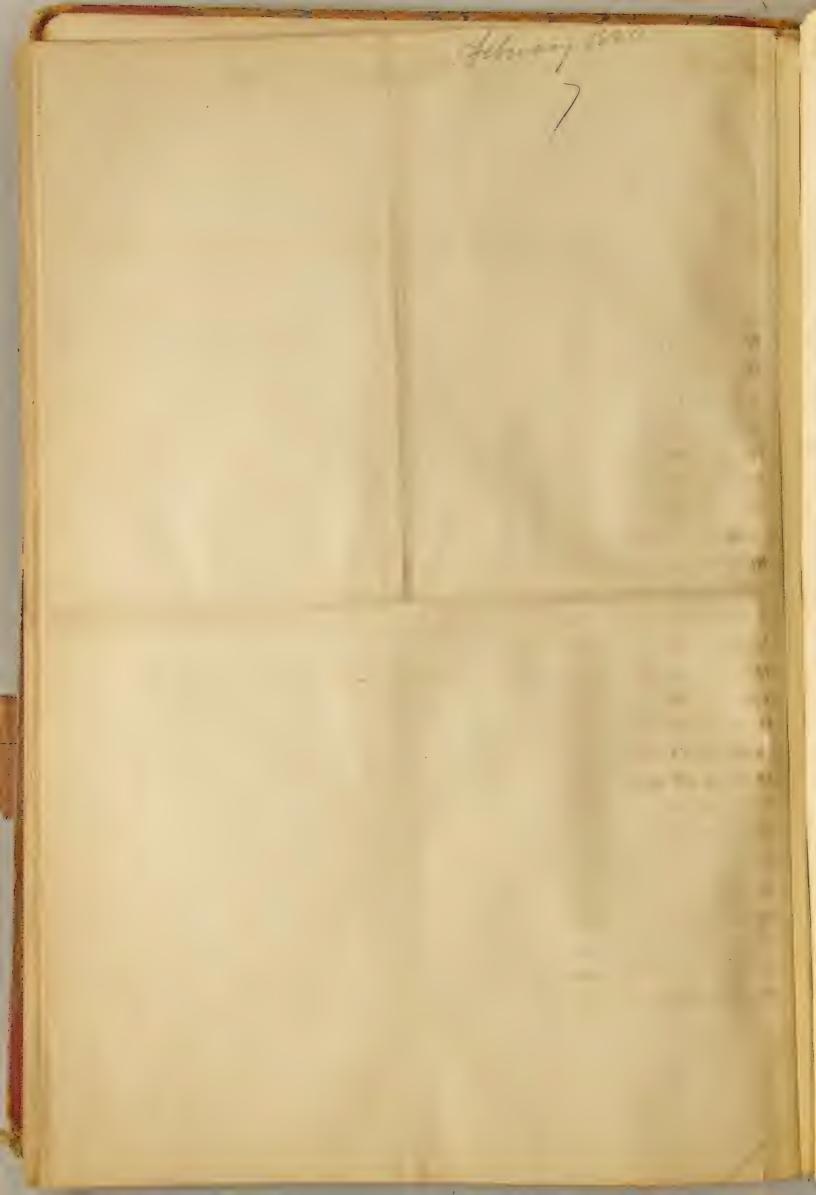
## Atmospheric Observations on board U.S.S andie The feether

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1-9	× 29.98	-43.84	29.995	742,88	30.03	-42.61	14 18 89		
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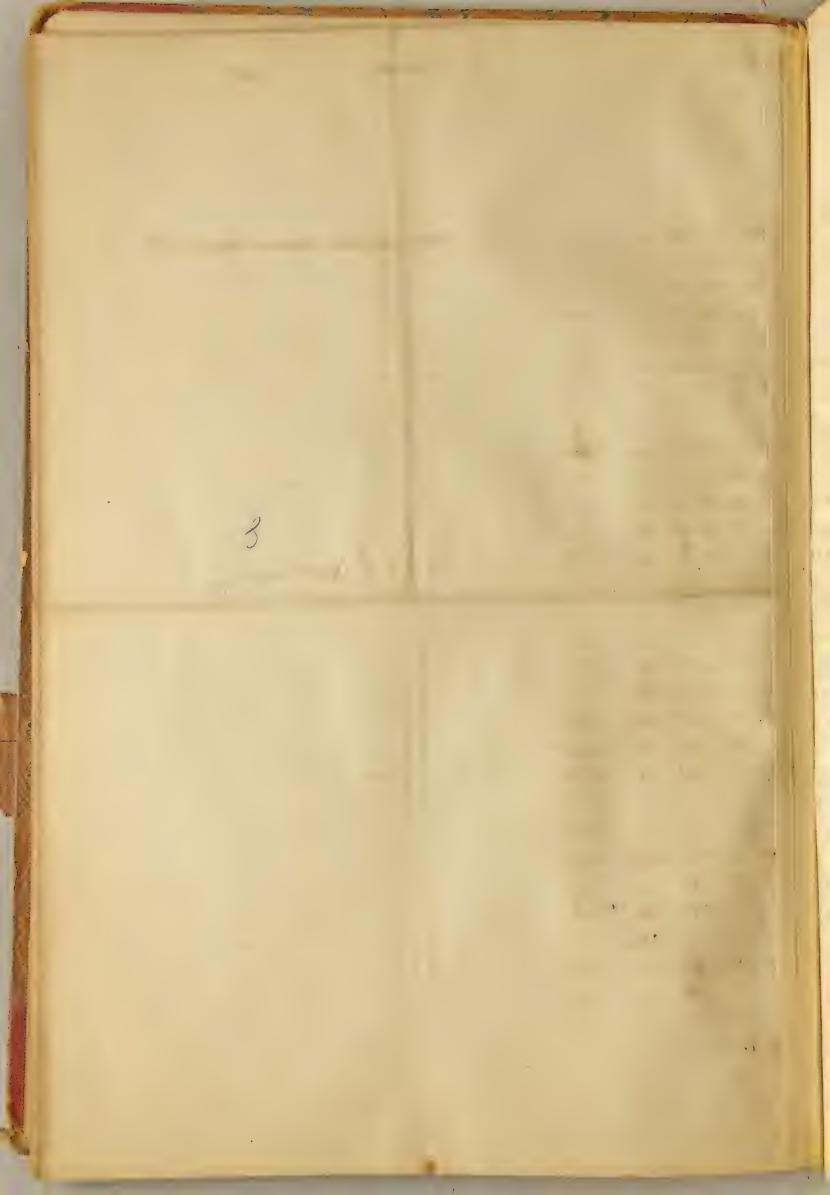
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## Atmospheric Observations on board U.S.S Fretie Ohr Juli

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		SPAR DECK				10		BERRY	
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3 30.34		30,33	-41.11	30.37	-43.41	25 9	93,5	14 1	, 10 /65
4 30.55	•	3036	-2122	31.40	-44 44	18 14	5 85-	14 1	6 15
5 30,20	·	30.13	-38:33	30.11	-4056	14 /	8 89	14 1.	39 /5
6 30./3	***	29.98	-3444	30.011	-35,56	, // /		14 1.	
7 29.90		29.78	-30	29.72	-33,89	. 14.1	13 89	12 11	1. 1/
8 27.54		29.53	-36.11	29.57	-37.22	1651	5.84	18 1	17/17
1 29.66		29.70	-30.00	29.84	-32.78		484		105/
10 29.84		29.84	2833	29.94	-3222		95=		
11 29.97		30.08	-30,89	30 18	-25,00		586-		
12 30.05		29.94	-20,00	29.72	21.11		4584		
13 29.3k		29.44	-19.17	21.63	-23,33		5 80		
11 29.62		29.75	-24,1,4	29.94	-25.57		4 89		
15 34.16	•	30.25	-30,00	30.34	-32.22		4584		
16 30.48		30,54	-3278	30.45	-37.20		8 86		۷
17 30.40		30.54	-31.67	30.58	-33.61		7 90		
18 30,41		30,28	-28,33	30,23	-2833		5-89		
19 30,1/		30./3	-27.50	30.14	- 26,47		3 83		
20 30.18		29.93	-25.28	30.03	-31.67		3 88		
21 30.2/		30.03	-2633	29.70	-2147		4,589.28		
22 29, 34		29.45	-2194	29.57	-21.47		5-89	-7,	
23 29.63		29.76	-25:5%	29.87	-2844		6 90	17/	150 15
21 29.91		29.92	-25:43	30.02	-28 Cd		3 89		
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27.81		29.72	7.4	29.7/	-11.11		15-80		
29.80		30.05	-15.28	30.19	-17.22		4.89		
30,3	_	30.87	-18,04	30.40	-/833		1672		
30.32		29.83	-/2.22	29.87					
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AV18463	servations for earhon					1	/b :		

Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the more. The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in a Same instruments to be used in all hygrometric observations.

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1	риск.			AVERAC	SE NUMBER OF	SHIP'S COMPANY.			REMARKS.		
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Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over neeks of jars.

measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity.

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litnus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid process, extracted from Wilson's Hand-Book of Hygiene, is recommended: liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the by calculating according to the atomic weights.

of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained

eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

into volume according to the atomic weights, and in one sum by the factor .39748+. which has combined with the carbonic acid. The amount of the latter is obtained by converting weight difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. Thirty cubic continueters of lime are poured into the graduated glass and its alkalinity determined

of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes. the lime water before and after it has been placed in the jar by 795 and divide this sum by the number The following rule will simplify the calculation: Multiply the difference between the alkalinity of

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62° may be stated with sufficient accuracy thus: For every 5° Fahrenheit above 62° add 1 per cent, to the As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit.

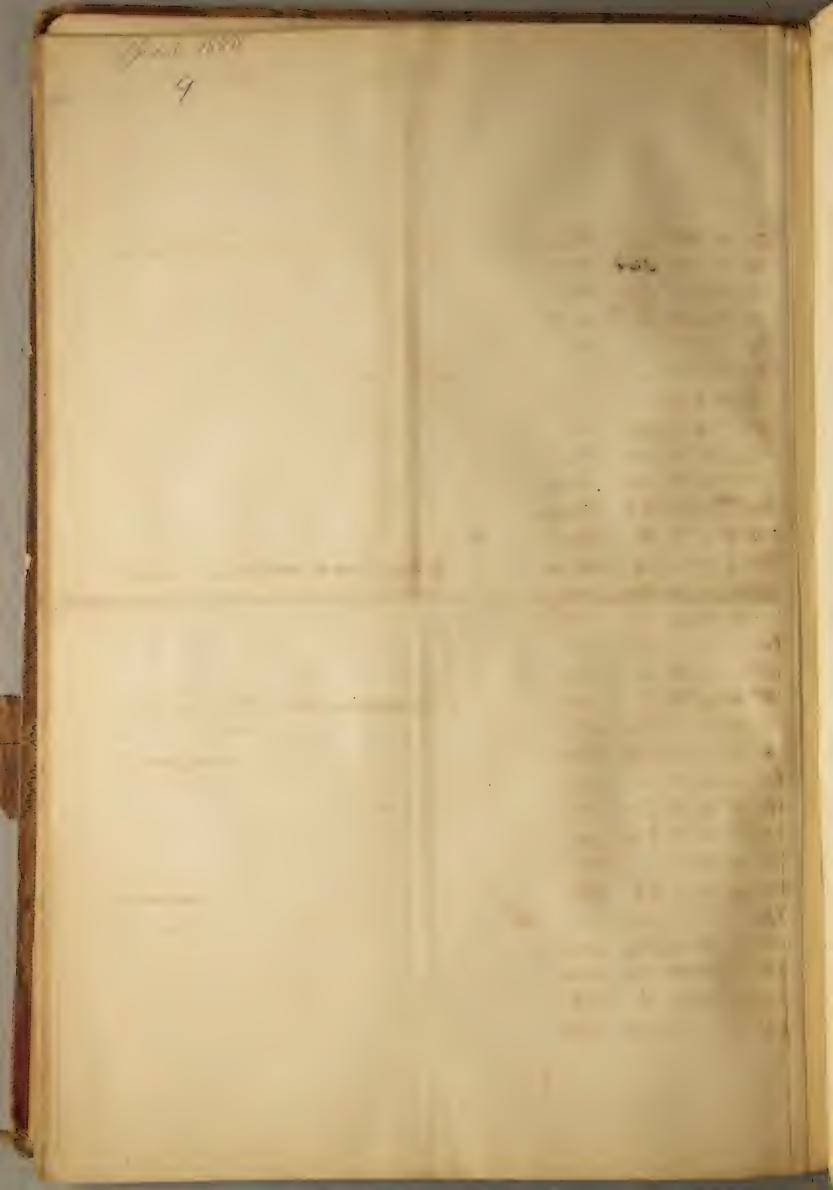
The formula for the correction for pressure is as follows:

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-30: observed height of bar. : : capacity : z.

· · · · · · · · · · · · · · · · · · ·	1		SELVAIN						BER	т /
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Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used

Directions: Pettenkofer's method is to be followed. For those not familiar with it the following Lime water and distilled water.

by calculating according to the atomic weights. of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 process, extracted from Wilson's Hand-Book of Hygiene, is recommended: The analysis depends on the relative alkalinity of lime water before and after it has absorbed the The amount of oxalic acid required for neutralization

of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair

that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper seemed by a tightly-fitting india-rubber cap. The jar is then well shaken so eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

into volume according to the atomic weights, and in one sum by the factor 39748+. which has combined with the carbonic acid. The amount of the latter is obtained by converting weight difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. The Thirty cubic centimeters of lime are poured into the graduated glass and its alkalinity determined

the lime water before and after it has been placed in the jar by 795 and divide this sum by the number The following rule will simplify the calculation: Multiply the difference between the alkalinity of

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62°. may be stated with sufficient accuracy thus: For every 5° Fahrenheit above 62° add 1 per cent, to the As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes, A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit,

The formula for the correction for pressure is as follows:

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-30 : observed height of bar. : : capacity : z.

Jeann "

Atmospheric O	0001 (0001			J	
	SPAR DECK.				BERTI
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			rái <sub>t.</sub>	idity.	
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= 29.92 · 6.34	29.87	-4,57	29.38 4.33	9,5 8 80	120
: 29.45 -6.11	29,46	-8,33	29.73 -1056	12.5 11 82,5	40
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5 29.75 -1333.	29.77	-1611		9 8 86	
.0 27,73 -17,78	29,96	-19.47	30,06 -1838		
7 30,14 -1261.	30,/3	-12.89	30,11 -18,33		
· 24.78 -15:00	29.42	-11.50	29.60 -11.11		
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10 30/14 -15	30,25	-13.61	30,30 -,850	288	
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15 30.21 -11.11	30.16	-10,54	30.28 -12.78	10 9 86	14.8
16 30.38 -9.44	30.28	-10.56	30.20 -11.62	14 13 89	11 5
17 30.03 -8/6/	30,13	-872	30,25 -12,22	10,5 9.5 87	5/2 8
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21 29,95 -5,83		-2.39	30.09 -2.	958 8	
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			the second secon		

Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the n The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered i Same instruments to be used in all hygrometric observations.

	AVERAGE N	UMBER OF SII	IP'S COMPANY.		1	REMARKS.			
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					,				P. 1

The results will not be entered unless the observer is certain of their accuracy.

Mil Mulber .. Surgeon, U. S. N.



Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

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Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used.

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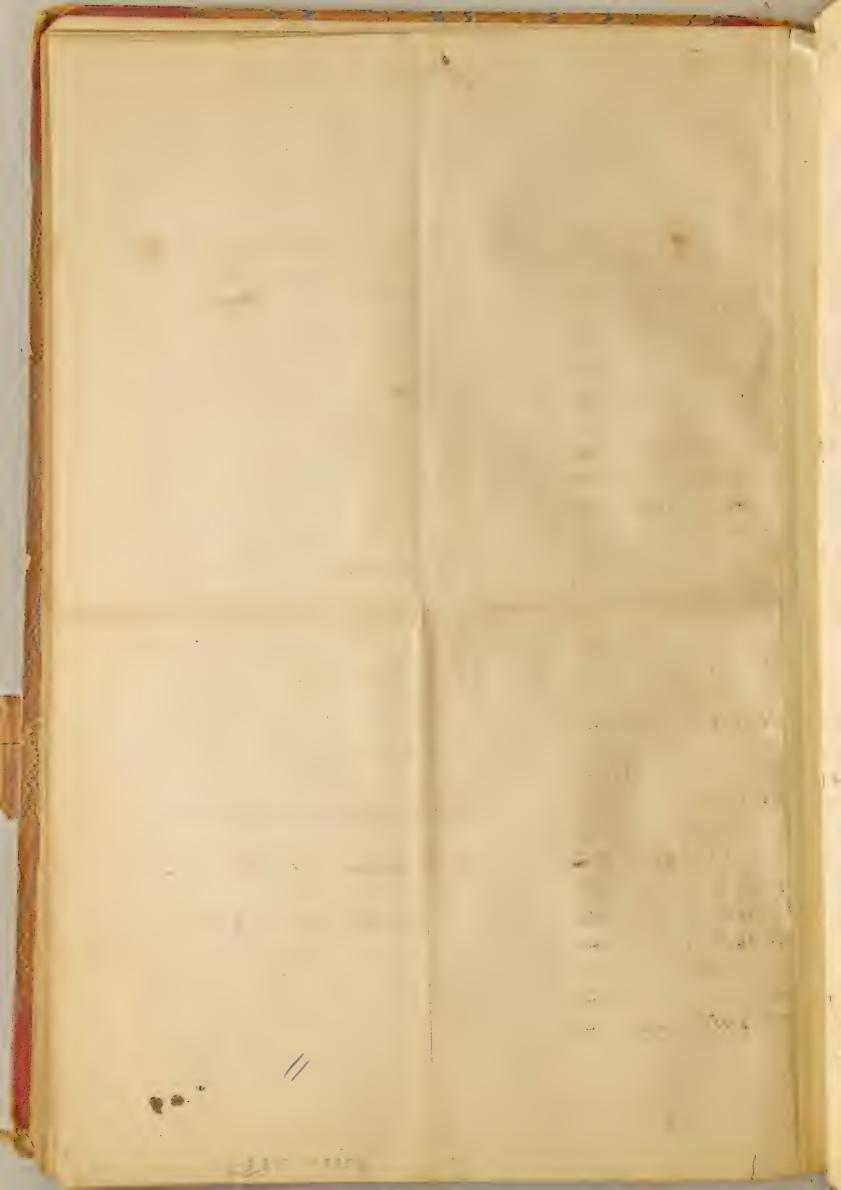
30: observed height of bar. : : capacity : z.

SPAR DECK.

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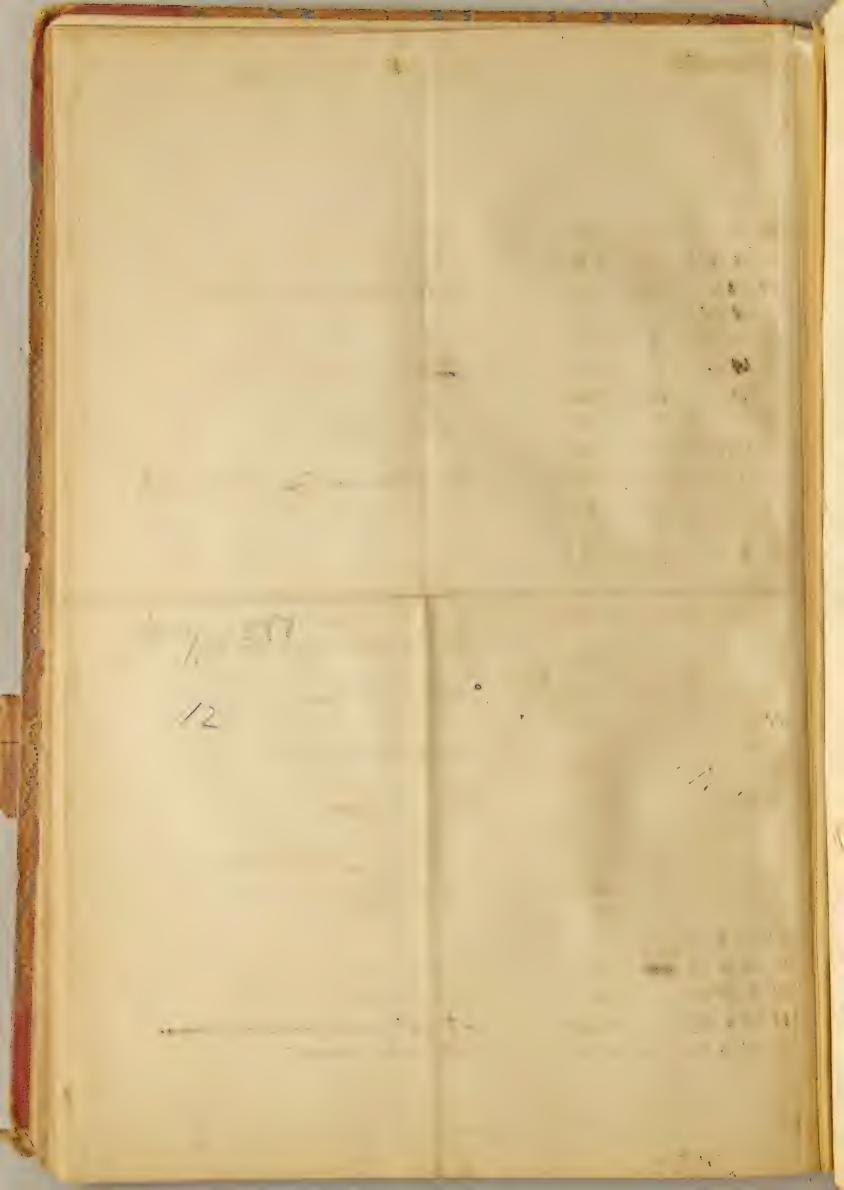
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## Atmospheric Observations on board U.S.S ardie An Marie Marie

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Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the mo. The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in Same instruments to be used in all hygrometric observations.

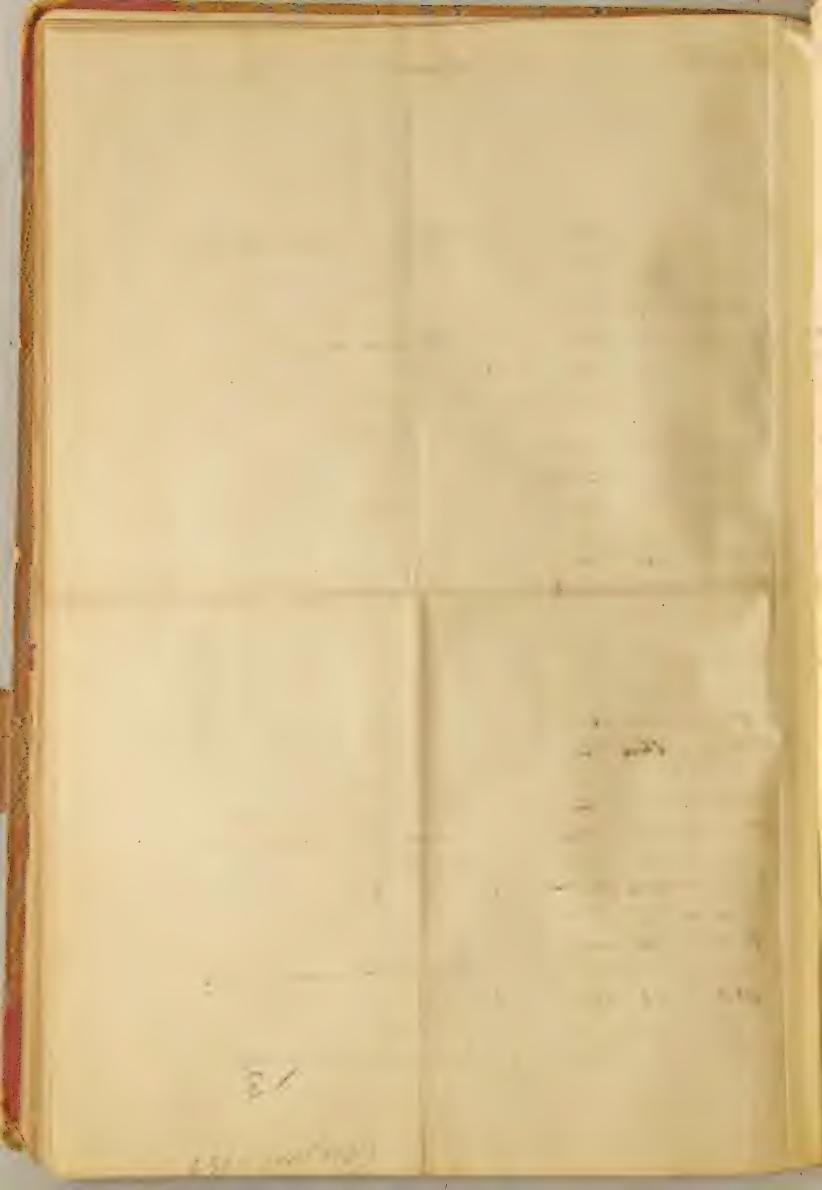
y annette , for the month of August , 1880 AVERAGE NUMBER OF SHIP'S COMPANY WIND. WEATHER 13 4 935 9,5 7 93,5 1 061 I Apundante water Beath duck day-45 6 9257 65 925 W/N UCA 1 " " day " 7 15925 75 7 93 11 E OLD 3 " " wit 858 93 9 85 5 WAW OCY 95 1 935 105 10 94 AW OCA Both duck day . : 1598 95 9 935 A OE 1,959 15 15835 19,5 12,5 825 DOC. R. P.M. 1 Apon but with ruin, B. d. washer was : 1593 10 9.5 43 mu/n 02, min " " days 95 835 11 105-935 NE OCRPM i day am. 125294 125 12 94 N OC. R. Mish J " wit 112 497 115 FI 94 N 00 " " dunji 57 59250 8,598 WILL LE, STILL 5818 97 405 10 94 DAZ Le 391 : 1805 155. 15 94 MN & O.C. Mick R 1819 1 Both ducker wurhend well 85 2511 11 100 ne/2 och R 120 1 11211 97 2/2 069. 1. 0 100 12 12 100 clui vef 11 15 935 105 105 100 due ce 11 25 935 125 125 100 Sexille 0 C 3.5 945 N/W or 3.5 12,2/2 97 Chu ac 2.05/ 34 293511511 94 718 022 1 Dick wit I dock dung 11 197 12212 97 7/2 OCM A deale day " 15 985115 11,5/00 nn 2: 0 cm 11 100 11 11 100 ar 2 och 11 555 20 185 86 NE OLM 4 B " wit " 1 14 135945 N2/E 02/ 6 Both decles was her wife -1 1884. 16515 84 EAZ OCT 2.07 Ddick dawn Ab day -8.13 12594 DE/A Oct M

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Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity.

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

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30 : observed height of bar. : : capacity : z.

	Atmospheric Obs	ervations on box	ard U.S.S Urd	he like fl.
-		SPAR DUCK		BERT
	10 A. M.	4 P. M.	10 P. 'M.	10 A. M.
	nidity.	n nidity.	Ranometer, Attached Thermometer, Dry bulb, Wet bulb, Relative humidity,	amidity
PLACE.	Barom Transfeed Transfeed Dry bulb. Wee bulb. Relative humi	Attached bermometry, by balls, Vet balls, gelative bal	vometer. vttached ermonac y bulb, et bulb.	y bulb. et hulb. ry bulb.
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In The pack	29.72 58 2,5 1,5 82	29.74 34 0.8 0.8 100	29.74 92 - 1.0- 1.5 84	3-8.5. 8 93 8.5 W
·	001007 "1 -1144	001.0 22 45 45 1611	29 73 30 -15-15-10	9 7.3 9 935 8.0
73: 52' Xdat 174° dl' W Long	3 29.84365 0.2-02	29.86 47 -0.5 -08	24.8644,5 0.0-0.5 4	0,57,5 4 425 1.2
	0440 111 115 12-100	177 45 117 -111 -120 10	al . I VI TOLINE WILL	The state of the s
	= 29 90 51 -15-20 90	29.91 47-10-1.5 90	29.94 485-20-25 7	4 7.0 65 92511.01
73"41 N Lat 171:12 W Long	6 30.01 48.5-1.0-2.0 80	30.01 475-1.0-1.0100	29.96 47 - 6.0-6.0	**O. 0,0 00 0,0
	- 29:93 45.5-1.0-1.5 90	30.05 445-3.3-3.3 100	30.17 545-6.0-6.0	6,5 6,0 92,513.0 11111
	8 30.08 475-4.4-6.0 26	29.95 44-44	29.84 52 -4.4	5.5 5.0 92512.01.1"
4	9976 1.75-02-02100	29.68 47 +0.8 +0.8 100	29.72 30. 0.0 0.0 10	0. 9.2 9.0 97.010.0 13 14.0
73° 40 15 N.L. 176° 55° 36 W.L.y	10 29.76 47 0.0-0.2	29.88 47+02 0.0 96	29.98 48-5.2 Forger	4,3 4,0 43,570, 0 17 12
a di	11 29.82 45.5-1.5-2.0 90	29.76 455+ 0.5+0.0 90	0 29.78 56-0,5-0,5/0	0 8.0 7.5 93517.5-315 125
	00 40 515 112 -119 100	29.63 51 0.0-0.2	29.54 505-1.5-1.510	0 7.8 7.0 89 11.2,97 13.
78.46 30 NS. 176 30 40 W.Long	1:3 29.45 47.5-1.3 -1.3 /00	29.46 46-0.8-1.0 96	29.49 48-4.4-4.7	8.5. 8.5 100: 4.0 93 11
V	11 29.47 445-5.5 -66 87.	29:45 445-4.3-4.7	29.37 445-8.8 Form	7.0 6.5 925 7.5 1251
	11 29.47 445-6.5 -6 ( ) 15 29.16 400-60 :	29.28 47.0-7.5 Angen	29.45 515-11.0	6.0 5.5 925 13,5 19512
73. 36' N Lat 176°. 42° W Lang	16 29.55 48 -10.0 Fregue	29.38 48-94	29.63 505-12.0	9.0 7.3 79.515.5 PB 13.3
73° 30° N Lat	17 29.69 49-12 " "		29.57 54-9.5	" 9.0, 8.5, 93, 18.5 M 18.
73° 31'45" N. E. L.			29.55 55-13.5	7.0, 6,5 92,5 16. 14 14
	19 29.77 55-7	29.83 56-70	29.85 57-8,5	7.11: 6.5 . 92.5 8
73. 31' N Lat 176 56' W Long	20 27.92 34-77	29,93. 53-8.0	29.94 565 9.5	11.5 10.5 37.2 15 18351
73°. 24' 36" N 22 76' 53'. 45" W.L. 73°. 23' NEL	1	30.06 525-11.0	30.05 545-15.0	12 10,5 82. 145 18.
17637' WLm	22 30.03 32540	80.03 495-7.5	30.06 545-65	11 9,5 82 125 16
176 40 15 WL	00.07 400 10	30.05 54 -65	30.02 545-85	12 11.0 88 13 141
V	21 29.98 37 - 9.5	29.93 49 -7	29.92 55-85	10,5 9.5 87,5 10 3
	15 29.93 535-5.5°	29.63 545-7	29.56 545-55	75.7. 925-13 114
	26 29.67 544.4	29.76 52 -0.8	29.74 557.0	10. 9.5 93 14.3 139
	- 29.91 545-7.5	29.91 55.5-4.5	29.95-55-7.0	11,5 10.5 872 14.51
	28 30.04 55 -3.	30.03 555-3.5	30.04 57 -5	7 6.5 92,570
	30.08 54 -105	30.06.53-11.5	30.08 565-10.5	7.5 6.5 85,510.
	30.03 53 75.	30.00 49 -15	30.02 55-15.5	5 4 84 9.5
		4		

29.76 49.6-4.7-17 87 29.80 48.7-4.6-1.5 9 29.82 31.5 1.4-24 92.2 8.4 7.7 90.4 11.6

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AVERAGE ....

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Two glass jars, cubic capacity marked in cubic centimeters.

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass rods.

Glass bottle of one liter capacity.

Bottle containing papers of crystallized exalic acid of 2.25 grammes each.

Bottle containing litnus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used

Lime water and distilled water.

Directions: Pettenkofer's method is to be followed. For those not familiar with it the following process, extracted from Wilson's Hand-Book of Hygiene, is recommended:

The analysis depends on the relative alkalinity of lime water before and after it has absorbed the earbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in I liter of distilled water; 1 c. c. of this solution exactly neutralizes I milligramme of lime, and hence the amount of lime in a given quantity of lime water are be determined by adding the solution of oxalic acid until the point of neutralization is reached. The amount of oxalic acid required for neutralization expresses the alkalinity of the lime water. If the alkalinity of the lime water before and after it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained by calculating according to the atomic weights.

The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the iar.

After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so that the lipe water is made to thoroughly wash the contained air, and afterward is left to stand at least eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for analysis.

Thirty enbic contineters of line are poured into the graduated glass and its alkalinity determined by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. The difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of line which has combined with the carbonic acid. The amount of the latter is obtained by converting weight into volume according to the atomic weights, and in one sum by the factor .39748#.

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The formula for the correction for pursure is as follows:

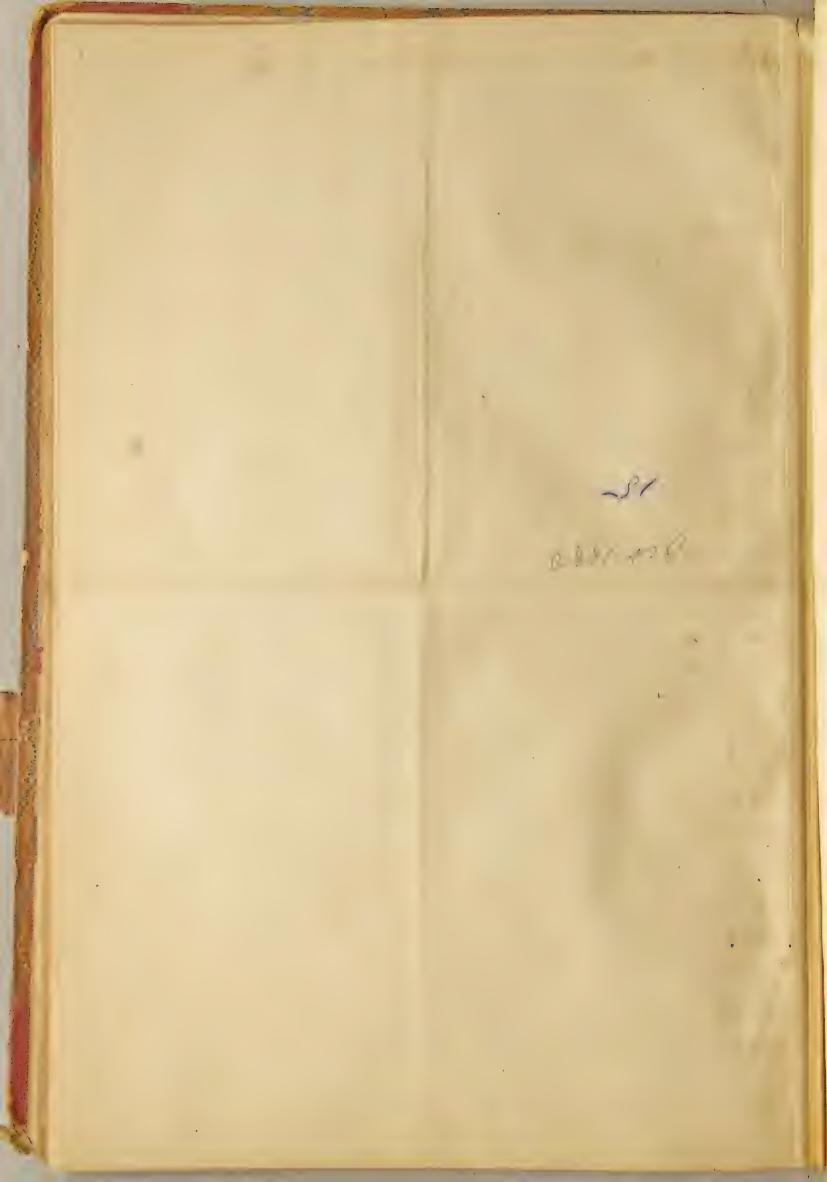
30: observed height of bar.:: capacity: z.

## Atmospheric Observations on board U.S. & Arctic She feath

· · · · · · · · · · · · · · · · · · ·	1 k			NODE OF
		SPAR DECK.		BERTI 4
	10 A. M	4 P. M.	10 P. M.	10 A. M. 4
Рьяси.	Barometer, Artis, b. d. Thermas, d. t. Dry bulb. Wet bulb.	Relative humidity  Marcheol  The reserve r.  Dry 1 db.  Wet buth.	Relative humidit  Bar meter.  Vitached  Thormometer.  Dry bulb.  Wet bulb.	Day to the War Carton Ball to the Carton Ball to th
	1 29.86 49-11.1	29.78.47-8.3	29.73 56-6.5	7. 6. 85 125 1 135
73°, 41° IV Lat	2 29.67 545-7.2	29.66 505-6.5	29.72.55.7	7 6 85 135 1 14
178 50 W Ing	3 29.90 53.5.12.2	29.99 535=105	30.06 56=15.5	9.8.8611.211
	4 30.16 49-11.3	30.12 53 -/35	30.23 56-16,5	5 3,5 77 9,5
	5 311.24 50-15.5	30.25 49 -122	30.27 53-11.5	5,5. 4 . 765. 8,5 951
	6 30.30 50-10.5	30.30 50 -10,5	30.38 33 -10.	3.5 2 74.5 9 3 1
	7 30.35 54-9.1	30.32 50 - 9.5	30.30 53-11	8.5 6.5 72.7.11.5 15 11
	8 30.15 49.541.	30.11 51-11.	30.11 52-11.5	9 7,5 79,5 12 100 14.
	· 30.07 49 -115	30.45 51	30.07.56-//	7 5572 125 184
	10 30.08 525-11	30,09,52-11.3	30.10 53-113	7 5,5.72 11.5 10,514
	11 30.08 55-122	30,07 50-108	30,10 55-11.1	9.5 8 20 185 1218
	12 30.11 52-11	30.14 50-12.5	30.15-38-128	111 85.80 12 181
	1:3 30.21 50 -12,5	30.22 51 -11,5	30.25 55-125	8 8611 101
	14 30.19 50 -14.4	*30.16 46-2.7	30.13 50 - 8.8.	65 46 70.511 95)
73°, 27'N LA	15 30,23 51 - 4.5	30.28 49 -7,2	30,311 53 - 22	10,5 9 81 12,5101
73.27N 200	16 30.30 53-17.5	30.30 47-20.0	30.35 53 -20,5	85 7,5 86 11,5 1016
	17 30,44-52-22.7	30,40 44-22,2	30.39 52-24.4	5.5.5. 92511 10,7
	18 30.27 48-17.7	30.25 48-15.	3024 53-138	6 5 85 9 8613
	19 30.24 53-13.5	30.14 53 - 5	30.13 33 -16,5	857 795105- 911
	20 30.00 325-12.7	29.88 55-10.5	29.79 53 - 9.4	8.6 72 125 16:31
	21 29.8856-12.7	30.00 55-12,2	30.19 57-11.5	10 8 74 12 10:
	22 30,38 57-11.6	3041 53-11.6	30,49,53-11,0	12 10 76 15 13.51
	23 30 68 52-188	30.72 52-21.1	30.78 53 -18.3	10 8 74 14 120
	21 30.55 56-15.	30.42 51 -15	30,30 52-4.4	9 7 73 12 10:1
	25 30.10 49-225	30.02 43-215	30.00 50-22.2	7,5 5,5 7/8/1 10
	26 30.00 54-20.5	30.07 46-22,2	30.15 53-205	4,5-3 70,5-11 . 1
	27 3426 47-18.8	30.35-57-18.3	30.42 52-17.7	75 6 78511 10
	28 <b>3057 53-</b> /5,5	30,60 50 -20,5	30.59 52-19.4	9 7 73 15 13
	20 30.58 5/-20,5	30.59.49-23.8	30.69.52-25.5	7 6 85-13 11
	30 30,71 475-25,5	30.73 52-21.6	30.70 535-23,3	9.5 8 80 125 11
	31 30.62 495-23,3	30.57 52	30.50 51-18,3	5,5.4 76512 10
AVERAGE	30,23 51,2 -15	305 · ~! ~! /:	30,24 63,7-15,3	7.7 5.9 78.7 11.7 103
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					7, 20 00,
1.	DECK AVERAG	E NUMBER OF	SHIP'S COMPANY.		REMARKS.
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	in the state of th		acid corrections. Pemissure, primes. P		
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## Atmospheric Observations on board U.S. & arche Ohigh

		SPAR DECK.		BERTH
	10 A. M	f.p. M.	10 г. м.	10-л. м. 4
Praci	1000 1 1		B B A B A B A B A B A B A B A B A B A B	Dy corn.  With h.  Belivele oblay.  Daylin.
	1 30,38 54-18,3	30,37 53-16.6	30,39 55-14.4	12,10 76 125 18
200 1.10 Act 1	2 30.2600-15.	30,15-51-12,5	30.18.56-16.1	16 13 69 12 11
73°. 44° N Lut 179. 57 E Lug	3- 30,34 5% -19,4	30,38 50-20,5	30,38 51,5-26.1	1.7 15,5.85 15,5 1.
*	4 30,04 45-13.3.	29.89 46-12.3	29.80 53 -125	15 12 66 14,5 131
	: 29.77 50 -22.2	29.80 48-23,3	29.88 5 3-28,8	16 14.5.84 15 78
	6 29.92 5/29.4.	29,98 44-31,1	30,70 52-29,4	12 78 12 12 12
73° 40' 8	7 30,02 43 -305	30.05 45-294	30,15 37 -30,5	11 9 75-115 35
179° 27' W.	8 30,20 43-288	30.19 44-29.4	3020 48-27.7 =	11.59 81 95 87
	0 30,09 48-27,2	30.05-49-261	3000 53-244	13,511 72 11,5 11
	10 29.83 49.5-25;	29.78 48 - 26.1	29.77 51 =24.1	18 11 77 12 161
	11 29.70 47 -27.7	29.67 46-28.5	29.65 57 -28.5	135 11 72 10 8
	12 2951 45-288	29.46 44 - 30.	29.50 53-27.7	8,5 7 80 9,5 2051
	13 29.69 49 -24.6	29.75 49.5-24	29.79 54 -23.8	10 8 74 9 73
	11 29.70 50 -24.4	29.90 49 -27.7	30.03 51 -29.4	11. 9 75 12 82
	15 3.045 49 -27.7.	30,64 26-27.7	30,92 50 -29.4	13,811 72 10 141
	16 31,11 50 -29.4	31.0,5 46 +28,3	30.95. 51 +25.5.	7 6 85- 9,8 451
	17 30.4850-16.6	30.29 54-14.4	30,18.58-12.7	9 8 86 10 %
	18 29.93 60-14.4	29.80 58-13.3	29.70 57 -13.3	12 10 76 135 1851
	10 29.69 60 -13.3.	29,48 55,5-138	29,80 36-17.7	195.10 82 15 1401
75°48' N	20 29.93 56-16.1	30,00 55-18,8	3009 60-183	13 11 77 155 114
179: 49: 8	21 30.25 4 1 41.0	30,2057-130	30,28 59 -15.5	14 11,8735 13,5 1825
	22 30.23 555-21.6	30,20 5. 2-23,3	30,20 58 - 20,5	11 9. 75- 10.8 408,
	23 30,1954-23,3	30.17 53-23.8	30,20 5.4-233	17 9 75. 10 241
	21 30.27 65 -22,7	34.30 56-26,1	30,3654-24.4	14.5/2 73 12.5/11,
	25 30,39 60=21,6	30,33 5.6 -24.1	30.29 5.5-23.3	11,5 10, 82 10
	26 80.14 53-23,8	30,0450 -21.6	30.05 575-19.4	14 12 78 145 17
970 111 12	. 30,01 59 -194	29.97 55-12.1	29.95 61 -17.1	16 14 79 14 131
73° . 41' 8" '78" 37' E	28 2998 60 -183	29.94 49-188	90,03 615-20	155 13 74 145 18
74°, 0 ×	29 8024 60-20	30,20 56-20	30,00 57 -17.7	125 10 71 13 17
	30 2960 57-66	29.58 le 3 -6.le.	29.66.61 -61	145 12 73 16 19
	31			1 /.
Average	30.10 5Z-215	30.06 909-219	3017 55 -21.7	12,710,6 745 12,2 1-

Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the more than the time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in Same instruments to be used in all hygrometric observations.

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	2 - 1101	uld be	selected	l. Th	e results wil	l not be entered			er is certain o	f their accuracy	·		
	<sup>8)</sup> 11) G	f Rem	irks.										



Two glass jars, cubic capacity marked in cubic centimeters. For assertaining the amount of carbonic acid in the air the following apparatus is supplied

India-rubber stoppers, and sheet india rubber to tie over neeks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity.

Bottle containing papers of crystallized oxalie acid of 2.25 grammes each.

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommend Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

by calculating according to the atomic weights. of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; I c. c. of this solution exactly neutralizes I milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair

eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime which has combined with the carbonic acid. The amount of the latter is obtained by converting weight by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. The Thirty cubic centimeters of lime are poured into the graduated glass and its alkalinity determined

into volume according to the atomic weights, and in one sum by the factor 39748+.

The following rule will simplify the calculation: Multiply the difference between the alkalinity of the lime water before and after it has been placed in the jar by 795 and divide this sum by the number

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62°. may be stated with sufficient accuracy thus: For every 5° Fahrenheit above 62° add 1 per cent, to the As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes. A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit.

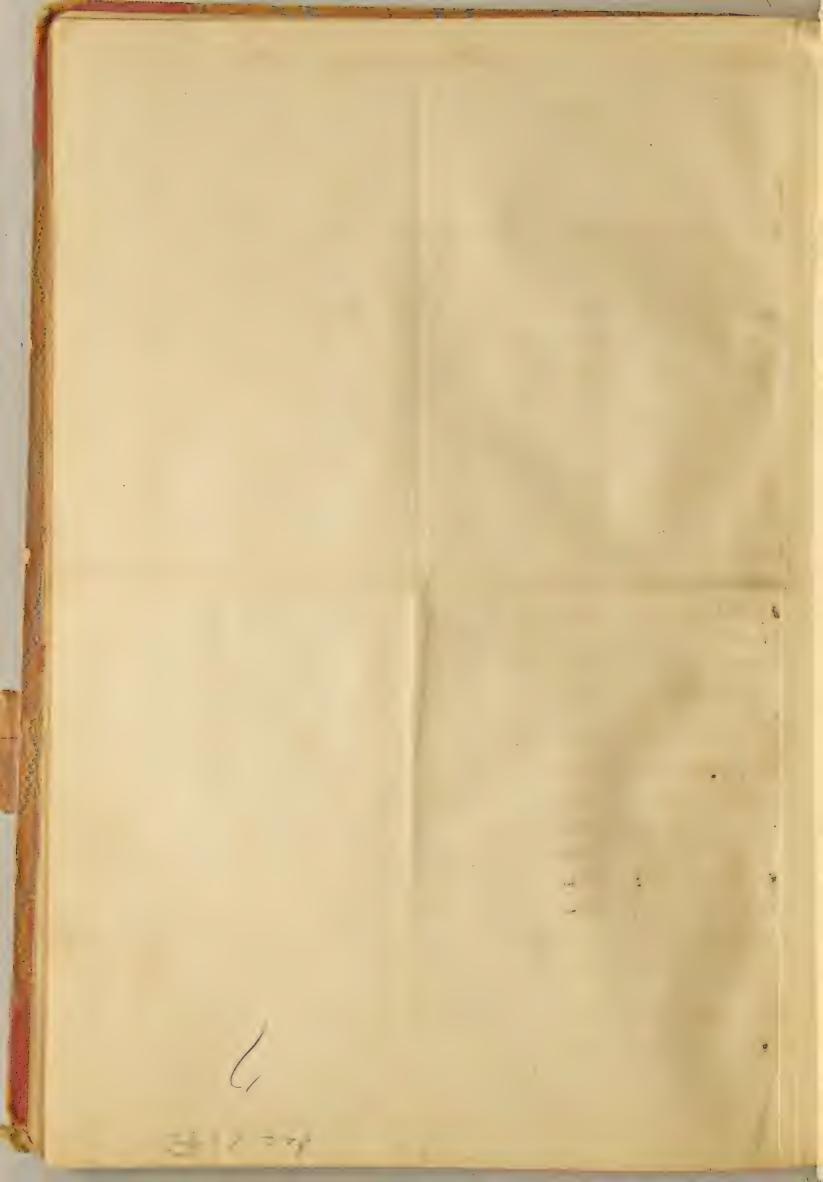
The formula for the correction for pressure is as follows:

30 : observed height of bar. : : capacity : z.

		SPAR DECK.		Rue
	10 A. M.	1 P. M.	10 г. м.	10 A. M.
Релег	Вана в В В В В В В В В В В В В В В В В В В	Relativ, hom. sty.  Barometer,  Atta, ped.  Therm, neter,  Dry ba, b.  Wet bulb,	Relative humidity.  Basemeter.  Avenched  Tl. mometer.  Dry bulb.	Relative humidity.  We toulb.  Re 've humidity.  Us, 'alb.
	1 29,63 64 -8,3	29.55.59 34	29.82 60-17.7	16 13,574 15 216
	2 29.88 63-20.5	300 2 545-223	301037-22,2	11 9 75-12 1
	30,5854-25,5	30,4051,5-23,8	30,54.58-20,	11597211
Las 74° N	1290857-10	29,9053-7.0	29.89.61,5-18.6	12 10 76 145 1 13
1 179 10 2	29.89 57-12.2	30,23 57 -17.2	30.44.63-23.8	15 13 78 14 110
124 73°, 53' N Ly 17:1. 3 E	6 30,52 58-294	30,50 54 -28,8	30.48 60-29.4	13 105 715 13 712
	7 30 28 55-24.4	30.00 30-103	29,9561-22	125-105-765-13 713
	- 27.80 90 - 22,2	29.80 55 -21.1	29.88 61-22,2	12510 71 135 1511
	9 29.87 53-254	29,80 50 -28.	29.83.41-277	1251071 12 19/1
	10 29. 69 55-24,4	29.62 52-25.5	29.56 55 -23.8	11 9 75 9 96
	11 50.09 55-28,3	30.19 52-30.0	30,29 5.3-31.6	12 10 70 10 14
	12 30.0355-28,3	30,05 62-255	29.98 54-23.8	95 7 675-11 55
	13 29.93 55 23,3	29.7554 -13,3	29.73 54-23.8	13 11 77 15-173
	14 29.70 5D-28,3	29.82 49-30.	30.05 55-32.7	105 9 81- 11 15
	13 30.37 52 -23.3	30,34 50 -34.4	303855-341	10 9 86 135 1121
	16 3024 57 -35.5	3005 52 4333	29,96 56-322	13,5:11 72 12 1261
	17 29,75 33 -38,3	29.67 445-344	2945 53-33,3	145 12 73 14 17351
	18 29.59 5°0 =28,3	29.6249 426.6	29.69 56-21.6	8 6 72 115 1251
	19 29.68 54 -29.4	29.49 52 300	29.78 57-31.1	13:11 77 125:112 1
	29,90 39 -31,6	24,85 53 -28,8	29.72.64-265	11 9581 14 1835
	21 29.79 58-24.4	29.7049 -24.4	2972:55-238	105 115 77 13 17
	22 29.75-52-228	29.89 495-255	30.0652-23.3	13 11 77 14 705
	30,30 52-24,4	30.30 48-266	30.15 52-261	11 9 27 145/33
	21 29,87 49 -21.1	29.90 47-18.8	30.02 56-17.7	14573 70 12 110
	25 29.75 57-12.7	2980 54-155	29 80 555-155	12510 71 148:13
	26 29.75 55 -15.0	2955 63-177	29.9456-23.8	15:5 135 77 16 14.
2478:37.8	11 3002 HH-283	30,06 525-294	30.02 55-254	15. 13 78 16 14:
Lung 179, 32' W	× 30,17 53-31,1	30,2052-322	30.20 5.2-32.2	13,5 11 72 15 14
<i>y</i>	3014 57-31.4	30,08 49-266	30.05.53-261	12 10 70 16 13
	29.79 5.0-21.6	24,50 30 -188	29,67 525-22,2	115 9 72 11 %
	31 30.73 64-23.8	29,83 53 -29.1	2997 525-30,	15 13 78 14 138
Aversor	29,9; :-:.	29 93 533 -26.6	29.97 55.7-24.4	122 107 748 138 11
	Observations for enrhance		27.71 30 11 24.4	129 10.1 198 10811

Observations for carbonic acid should be made at least once a week, and the air of the berth deek at night or early in the mor. The time and circumstances of observations for carbonic acid and the wetting of the deeks from any cause will be entered in change instruments to be used in all hygrometric observations.

	K. AVERAGE	AVERAGE NUMBER OF SHIP'S COMPANY.				REMAKKS.				
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.,	Relative hemidity.  Relative hemidity.	Carbonic acid cer-	1, 000 volumes.  Number of sick, excluding injuries.	B 0.00						
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	the all be selected. The results will cor Remarks.	not be entered unless t	the observ	er is certain of th	cir accuracy.					



Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over neeks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths

Glass bottle of one liter capacity.

Bottle containing litmus or turmeric paper. Bottle containing papers of crystallized oxalic acid of 2.25 grammes each

 $\Lambda$  small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommended: Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

by calculating according to the atomic weights. of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of line water before and after it has absorbed the The amount of oxalic acid required for neutralization

The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the

eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper seemed by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

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The formula for the correction for pressure is as follows:

30 : observed height of bar. : : capacity : :.

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-

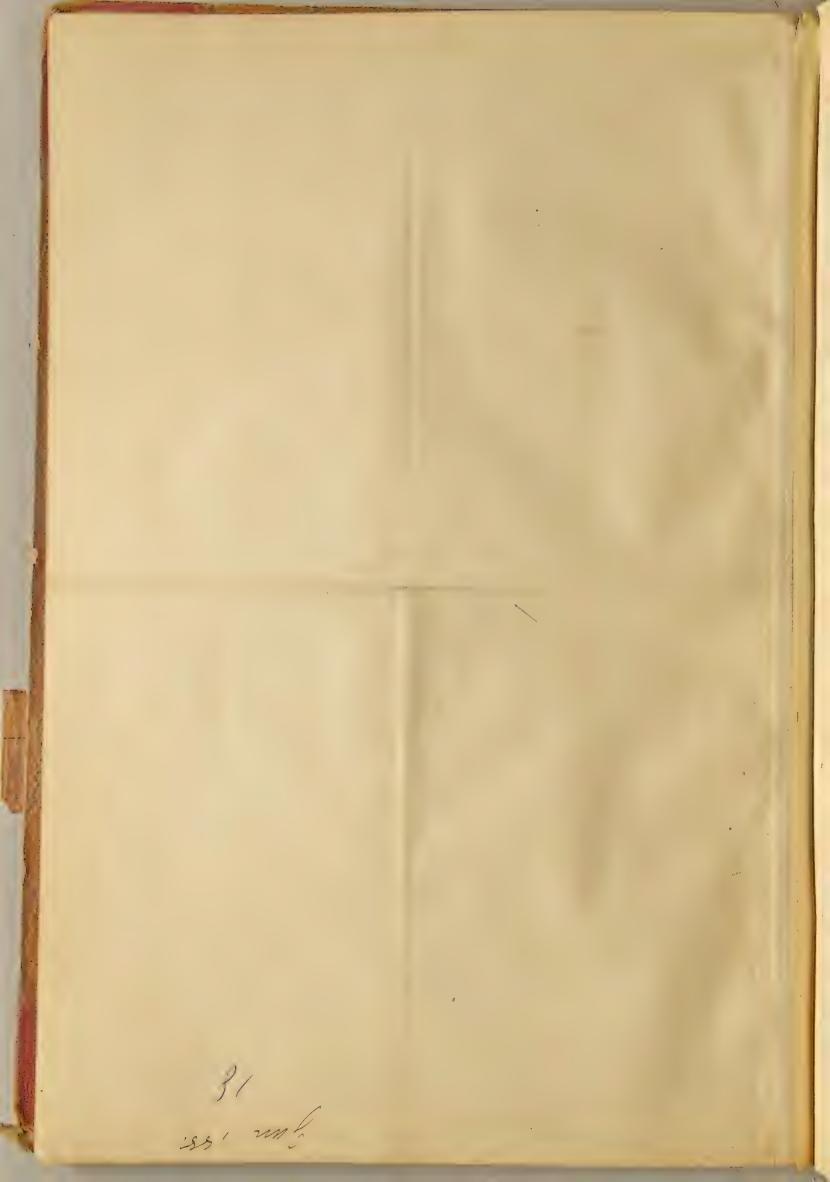
## Atmospheric Observations on board U.S.S India The

	SPAR DECK		BERTI
10 a. m.	4 P. M.	10 г. м,	10 A. M.
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1 30 Sh 56 -141	30,63 58 -18,3	3069 62-18.8	14,5 14,76 14. 1.8
2 30.58 58-183	30 40 33-183	30.26 57 -18.0.	145 138 698 155 125
3 29,96 55 -144	29,82 54-15,5	29.74 62-15.0	15 13 78 145 14
1 29.64 55-14.4	2968 53 -15:5	29.80 5721.4	16 14 79 17 14
5 34113 58-30,5	30,03 54-31,6	30,02 60-29.4	16 135 735 155 134
a 29.78 55 -25.5	29.75.55-24.6	29.87 59-31.1	15 13 78-13 17
7 30/5 56-33.8	30,2055-33,3	30,27 57 -31.6	12 18 78 14,5123
30.16.86-24.4	3011 52-216	30,18° 56-18.8	12.10.78 13 111
9 30,385/ -18,3	30.48.52-19.4	3053 57-211	145 12 73 15 1231
10 30,45 56,5-16.1	30,38.57-13,3	3037 61-127	17 1457516 18:41
11 30,54 58-15,0	306355-14.4	306461-133	145 14 76 15- 128
12 303054 -10.8	30,30 6.3 - 9.4	30,54 57-12,2	17 13 78 15 128
18 31,02 60 -17.2	31,05-58-20.0	31.07 40-194	14 14 79 145 13
14 30,90 57 -17,7	30.83 5.7-17.2	30.74 \$9-16.1	14 115 725 14 125
15 30,42 54 -17.7	30 48 53-20,5	30,71 64-21,1	17 145 75 15 1281
16 307 2 55 -21.1	3070 50 -21,1	30,78 61 -21,4	15 125 73 13-117.1
17 30,84 54-22.7	30,8456-23,3	30.85 61-23.8	12 9571512 128
18 30.87 59 -244	30.73 57-250	30.73 62-250	10,8 8,575-14 128,
19 30,64 57 -24,4	30,57 57-25:0	30.53 62-24.4	11 9 75-14 125
30,25.54-22,7	30,15-5-0-23,8	30,1458-23,3	13 105715-145 129
21 30,23 52 -23,3	30.29 52-28.3	30,35.60-24,3	105 8575- 13 111
22 30,25,55-29,4	30,39 50 -31,4	30,4857-322	10 8 74 95 81
23 304953-016	30.45 51-31.4	30,42 57 -30,5	12/076/11 45
21 30,24 33-23,6	30.16 5:3.5-19.4	30.19 58-144	11 9 75 135 1648,
25 30,27 52-18,3	30.32 535-19.4	30,4458-211	145.12 73 12 Tus
20 30,53 52-2/,1	30,6049-244	30,73 57-26.6	125 10 71 13 117
27 30,73 5'3 -27,7	30,6252-27.7	30,57 56-28,3	13 11 77 13 117
2 3029 52-261	30.33 51-28,3	3030 55-27.2	14 135735145154
29		7.0	1 100 000 140 1001
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10016 55-217 AVERAGE .....

9038-537-354 3038 58 -124 439 114 749 133 1

February , for the month of ,1881 AVERAGE NUMBER OF SHIP'S COMPANY REMARKS 10 P. M. No. 33 WEATHER 6 14 178 14,5 125 78 Z Le 98/88/8188/5 135 835 DZ/E Le 16 14 16 14 79.002 cco 2,49 1 971874 17:15-80 WOW OCD 15 17 14 18 115 80 " Ge 1 13 Dek 8 B 11 77 11.5 10,5 872 E11 E Les 8:51 73 13512 83 W be 7811 17 185 12 88 25/2 60 73 18/13/145/13 78 ,02 be 7514 17 15.8.85 2NE be 3.758-1 761.18 15 13,583,5. 002 he 7811 18 16 14 79 02 6-79 1 13 145 125 78 78 THE LC 78 155 135 79 8 be 80 11 48/4 12 18 sold be 3 11 77.18 11 77 E/n 6 C 15/17813 11:72 012 be 18 145.125.78 D be 15/1 78 11 9581 1 be be 1.8284.1 118 179 12 10 742/0 557 17 10 85.80 Wn W 6 e 1 70 10 9 86 852 be 15 13 12 88 72 Le 15 65135-12 83 ENE OC9 15/083 15 13:78 Epn vey 12446 1 11.17 135 12 83 E/n beg wurten 1 17 NS 12 83 NNW be 15578 1451558957NW 12 1 1 61 64 2.0808 1 Buth chek would in italinding. orld be selected. The results will not be entered unless the observer is certain of their accuracy.



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Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommended: Directions; Pettenkofer's method is to be followed. For those not familiar with it the following

by calculating according to the atomic weights. of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained. it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

of bellows, or a bellows-pump may be used. In either case the nozzle should reach the bottom of the The jar should be perfectly clean and dry. The air to be examined is forced into the jar by a pair

eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

into volume according to the atomic weights, and in one sum by the factor .39748+ difference is doubled to account for the 30 c. c. left in the jar, and the product gives the amount of lime by the test solution. Then 30 c. c. are taken from the jar and the alkalinity also determined. which has combined with the carbonic acid. The amount of the latter is obtained by converting weight Thirty cubic centimeters of lime are poured into the graduated glass and its alkalinity determined

The following rule will simplify the calculation: Multiply the difference between the alkalinity of

amount of carbonic acid calculated as above, and deduct the same percentage for every 5° below 62°. may be stated with sufficient accuracy thus: For every 5° Fahrenheit 3bove 62° add 1 per cent, to the of cubic centimeters in the jar, minus 60. The result will be the ratio of carbonic acid per 1,000 volumes, As the coefficient of expansion of air is .0020361 for every degree of Fahrenheit, the rule for correction the lime water before and after it has been placed in the jar by 795 and divide this sum by the number A correction must be made for temperature as it is above or below the standard of 62° Fahrenheit.

The formula for the correction for pressure is as follows:

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-30 : observed height of bar. : capacity : z ///

		ON IN THAT	and the second s	BERT!
	10.00	SPAR DECK.	10 p. M.	10 A. M. 1
	10-х, м		A	, v
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	2 2994 49-244	29.97 49 -24.4	30,00 5.5 -23.8	125.117.82 14 1:81
	: 30.43 53 -24.4	34.42 57-23.3	30.10 52-46	105 85 75 12. 1151
	1 30,28 30-21,4	31.32 51 -227	. 3034 53 -227	13 11 77 175 10
	30.33 55-24,1	30,28 52-238	30 24 57 -20.8	115 10 8 15 145 12
	6 30.14 54-24.4	30,09 52-214	31,49 54-21.1	14 12 78 13 177
	7 29.95.56 -16.1	29.98-3.8-14.4	29.96 60-14.4	15:5 13579 14 1:78
	8 2999 56-183	30.12 59 -17.7	30.28 58 -17.2	12 10 78 13 1.77
	9 30,46 55-23.6	30,53 53,5-27,2	30,53 58,5-28,3	16 14 79 14 1211
	10 31131 57-215	3420 55-19.4	3010 58-14.1	14 125 835035 183
	11 30,05 58-11.4	30.05 57-14.4	311.10 545-19.1	153-10579-145-123
	12 30,05.54,5-18.3	3005 58=15,5	29.98 56-13.8	135 12 83 135 1:83
	13 29,95 52 -15:5	3000 54-17.2	3073 59 -144	16-14 29 15 198
	14 30,08 56-155	3025-53-155	3010 528-188	155 135 79 145 7.
	15 30.18 54-24.4	30,2050 -294	30,23 53 - 51.6	16515 85-145 188
	10 3014 53-32,7	30,20 50,5-24.1	29.9854-23.8	15513 74 155 1.44
	17 2979 53 -238	29.72 53 -23.3	29,95 53-21.6	145 12579 14 1218
	18 29 les 51 -21.le	296048-23.8	29,69 54,5-24,4	14,512 73 12,5 10;
	19 29.84 57 -26,6	29.90 49-23.8	29.99 53 -28.8	15 12573 155 187
	21 30,00 5/ -322	299951-327	30,03 577 -333	14 13 78 165 14579
	21 30/04 51 -31/1	30.15 50 - 322	30.22 545-322	155 13 8 15 1371
	22 30,40 32-31,1	30.48 51 -30,0	30,53 53 -333	125 105 765 13 179
	20 30.78 53 -355	30,87 5-6-36,1	3008 523-355	13,5 11,5 77,5 12,5 1,50
	21 31.19 53 -3 55	31.10 50-355	31.03 46-34.4	11 14 87 13 113
	25 30.4953-288	30,42.47 -24.4	30.30 52-20.5	105 9 81 105 981
	26 31.10 55 -16.6	30.01 52-155	3007 59-150	135 11 72 135 143
	27 30,28 56 -161	30.42 55-12.7	30.53 58-28.0	155 13 79 16 1484
	28 3/132 55-183	30,37535-18.3	30.54 57-22.2	17 15-80 175 1875
	20 30,6535-26!	311,63 555-244	30.59 60-23.3	17 14 70 18 15
	30 303550-200	30,26 56-188	30.22 57-17.7	19:16 72 155 146
	at 30.14 57-18.2	30,23 55-15,0	30.35 57-144	17 15 80 16 127
ERAGE	30.19 54.1-23	3023 554-26	30,19 53,9-23.1	14,612.7 78 145 Ag
	Observations for curbonic	actil should be made at least and		190 145 Kg

Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the mor The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in a Same instruments to be used in all hygrometric observations.

11.11	ppck. Averag	E NUMBER OF	SHIP'S COMPANY.		REMARKS, ,
_	P. M. 10 P. M	No.		-	A CONTRACTOR OF THE PARTY OF TH
7) v	Dr. b.d.  West red.  Relative lumidity.	Weather.	or of the Tenper of the period Process of the period Process of the period Process of the period per		
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1:	should be selected. The results will i	oe 14 not be entered u	nless the observer	is certain of the	ir accuracy.

7 ch 158.

Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied:

India-rubber stoppers, and sheet india rubber to tie over necks of jars.

Glass measure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into tenths.

Glass bottle of one liter capacity

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each.

Bottle containing litmus or turmeric paper.

A small bellows, or, in its absence, a Davidson's syringe may be used.

Lime water and distilled water.

process, extracted from Wilson's Hand-Book of Hygiene, is recommended: Directions: Pettenkofer's method is to be followed. For those not familiar with it the following

by calculating according to the atomic weights. of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained it has absorbed the earbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. The amount of oxalic acid required for neutralization amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid liter of distilled water; I c. c. of this solution exactly neutralizes I milligramme of lime, and hence the carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 The analysis depends on the relative alkalinity of lime water before and after it has absorbed the

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eight hours and not more than twenty-four; 60 c. c. are introduced in order that 30 may be taken out for that the lime water is made to thoroughly wash the contained air, and afterward is left to stand at least the stopper, and the stopper secured by a tightly-fitting india-rubber cap. The jar is then well shaken so After the jar has been filled, 60 c. c. of lime water are introduced, the mouth of the jar closed by

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The formula for the correction for pressure is as follows:

30 : observed height of bar. : : capacity : z.

The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-

## Atmospheric Observations on board U.S.S

		SPAR DECK.		BERT , *
	10 A, M	1 p. st.	10 г. м	[0] A. M.
PLACE	Bar meter.  Artached The mount ter Dry buth, Wet bulh,		Relative humidity, ; Rarometer, Attached Thermometer, Dry bulb,	Relative humidity.  Dry balb.  Wet balb.  Relative hamidity.  Dry balb.
	1 29.97 5.2-22.2	29,93 495-21.6	29,97 57-21.6	195 125 885 163
	= 30.06 54 -22.2	30.12 50 -22.7	30.21 55-22.2	145.14 74 17
	3 2027 50 -241	30,21 51 -244	3029 59-283	155 13 74 165 1
	1 303/56-29/	31129 54 -29,1	313261-30,5	18 15-71 155
	5 30,2755-319	30,28485-30,5	31,25 57 -32,7	14 11,570 13 1411
	6 30,22 49-32,7	30.25.50 31.6	30,30 59 -344	13 17 77 125. 13
	7 30.34 575-34.4	30,2252-333	30,25 57 - 33.8	18 15 71 15 8 10
	× 298356-272	29 5952-255	29.46.53-244	135 11 72 135 1813
	11 296249-244	29.72 47-31.1	29.83 57-34.4	11 10 87 13 11 18 1
	10 24.85.5.3 -35.0	29.73 485-284	29,43 53-24,7	15:5.12 68 16 12/5
	11 2965 53 -264	29,80 51-253	29.97.60-31.1	175/575-15 1812
	12 30,09 54-34.4	300948-322	3009555-338	15,8 18 74 45 1812
	13 24.92 47 -27.7	29.89 49-25:0	29,86 55-23,8	: 175 145 705 165 A 18
	11 2950 52-272	3012 49 -27.7	30,32 57-322	17 14 70 15,5 150,13
	15 3/152 50 -33,8	31.45 32-322	30,43575-33.4	15. 13 78 16 3 4
	16 30,28 55 -32,7	30,18 5:0 -30,0	30.13 53 -29.4	15. 12 68 16 13 1
	17 30,4654-255	30.06 49 - 26.1	30,12 63-28,8	15 12 68 17 12 145
	18 30.07 53 -27.7	30,00 50 -23,8	29.97 49-26.1	15513 74 145 11510
	19 29,95 58 - 25.0	29.95 54 -233	30,00 59-250	155 13 74 155 134 1
	20 34.15 36-227	30,22 5:2-214	30,30 59-252	13 10 66 16 131/3
	3031 53 -252	302855-20.2	30,33 57 304	75 9 70 125 11 W
	22 3035 55-305	3035 51-283	30.49 57 -300	145 115 675 14 1611
	23 30,39 55-29,4	30,27 52-277	30,23 57-29,4	135 105 665 155 123 1
	21 3006 52 27.7	30.00 51 -24.6	30,00 53-17.7	13 10 66 12 45
	25 3000 55-250	34.00 5.3 - 44	30,0858-27.7	10 8 94 12 9.55
	26 2999 45-27.7	2490 42-214	29.85 57-17.5	13 11 77 12 10%
	27 29,86 56-12,2	2989 58-172	30,10 63-26,1	155 13579 14 117
	28 3030 57-23,8	30.38 58-21.6	304857-238	14 13 89 135 18
	30,3452-21,6	3023 52-18,3	30.18 50-20.0	13 11 77 145 143
	3020 63-183	30,20 63-19,4	30,25 58-233	15 12578 155 14
	31 30.28 56-244	3029 64-222	3035-57-	12 10 76 14 14
Average	3019 533-27,1	3012 7 - 23		1.: 15 73

Observations for carbonic acid should be made at least once a week, and the air of the berth deck at night or early in the more. The time and circumstances of observations for carbonic acid and the wetting of the decks from any cause will be entered in example instruments to be used in all hygrometric observations.

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1.1	1 K AVERAGE	NUMBER OF SHIP'S COM	PANY.	REMARKS.	
	)	No.			
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	Wixb.	WEATHER,	ing in		
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	4 12 16 14 29 222	*			
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OR CANADA	add he selected. The results will no of Remarks.	t be entered unless the of	server is certain of thei	ir accuracy.	

1881 mul

Two glass jars, cubic capacity marked in cubic centimeters. For ascertaining the amount of carbonic acid in the air the following apparatus is supplied

India-rubber stoppers, and sheet india rubber to the over neeks of jars.

tilass pressure graduated to 60 c. c.

One Mohr's burette, 60 c. c., graduated into te-

Chase bottle of one liter equicity,

Bottle containing papers of crystallized oxalic acid of 2.25 grammes each,

Bottle containing litmus or turnoric paper.

 $\Lambda$  small belows, or, in its absence, a Davidson's syringe may be used,

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by calculating according to the atomic weights of lime in milligrammes which has united with the carbonic acid, and the amount of the latter is obtained it has absorbed the carbonic acid in the air contained in the glass jar, the difference will give the amount expresses the alkalinity of the lime water. If the alkalinity of the lime water be known before and after until the point of neutralization is reached. amount of lime in a given quantity of lime water can be determined by adding the solution of oxalic acid carbonic acid in the sample of air examined. 2.25 grammes of crystallized oxalic acid are dissolved in 1 liter of distilled water; 1 c. c. of this solution exactly neutralizes 1 milligramme of lime, and hence the The analysis depends on the relative alkalinity of lime water before and after it has absorbed the The amount of exalic ucid required for neutralization

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The result expressed by z is substituted for the actual capacity of the jar in the calculation for car-

## Atmospheric Observations on board U.S.S

		) SSOI VALUE OIL		
		SPAR DECK.		BERT
	10 а. м.	₽. M.	. 10 р. м	10 A. M.
PLACE.	DATE. de de de la compe	re hu . lity. ched amore	re hu - lity, ched ometer, utb.	re ha 'dity, alb, alb, ive ha idity anth,
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	29.86 38.4-2.1	39,87 4, 2-2,9	29.86 310-4.1	12.8 10.4 72,4 13.7
	021 29.66 32 -//./	29.45 32 -11.4	29.68 92 -11,5	11.3 9.5 7/3 10,1 7 103
	nor 29.70 32 -19.9	29.73 32 -/72	29,75° 82 -172	14,4121 74 14,31:130
	8££ 30,11 <b>4</b> 2 -23.6		1	141 125 835 14,1 12 15.3
	1880	29,98 32 -23,3	29.97 32 -23.5°	15.6 14.1 82.1 15.2 1. 5.8
	Jah 30,32 32 -33,7	+30,23 32 -33,7	30,31 32-34.4	
	714 29,97 32 -38,8	29,92 32 -38,7	29.85.32-38.9	11.4/0.889.8/21 13/18
	mich 30,03 32 - 28,1	30,01 32 -27,7	30,04 32 -31,4	15:3 14 86 15:4 27 188
	apx 24.80 32 -13.4	-29,79 32 -12.1	29,83 3.2 -16,2	11,2 10,485,9 15,8 1,3 16,7
	sug 29,97 32 -8.4.	-29.98 32 - 7.7	30,00 32 -10,6	9,9 8,9 83 10,6 1.313.6
	· .	90 29.78 37.7+2.4 1.8	88 39,1 32,8-15-18	12,5 8,7 8, 12,-10,2
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	ary 29.79 38 1.3 1.1	95.5-29.84 37.4 1.6 1.4	94 29,84 34,8 0.3 0.06	98 8.6. 8.2 97.2 10,9 1/4 11.
	29,76 49.4-4.7	25,80. 45,7-4.6	29.82 51,5-6,4	8.4: 7.7 90.4 11.4 11.7 12.
	024 30,23 51,2-15	30,22 50 -14.5	30.24 53.7-15:3	7.7 5.9 78.7 11.7 12 11.7
	724-30,10 52 -21,5	30,06 50,9-21,9	30,07 5321.7	12,7 10,676,5 12,2 1:1125
	<u> 202</u> 29,47 53,7-24,7	24,93 53,3-24,6	29,97 5°5,7-24.4.	12,2 10,7 74,5 13,2 13/2/
	2an 1881 30, 19 54,1-23	30,23 55,4-26	30,19 539-231	14.6 12.7 78.5 14.5 18.10,1
	19 30.0/ 55 -2/.7	30,38 53,7-254	30,38 58 -22,4	13,9 11,6 74,9 13,9 113,13,8
	mode 30,09 535-27.1	3012 51 -259	3012 565-276	145-12 73 14,6 18 129
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AVERAGE .....

29

31

	AVERAGE NUMBER OF	CHIPG	
DECK.	TOMBER OF	SHIP'S COMPANY.	REMARKS.
10 P. M.	No.		
Relative humidity.  Dry bath.  Wet balb.  Relative humidity.	WIND. WEATHER.	Carbonic acid corrected for Temp.  1, 000 volumes.  Number of sick, excluding injuries.	
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ing should be selected. The	results will not be entere	ed unless the observe	r is certain of their accuracy.
Remarks.			

